

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C
12V	23mΩ @ V _{GS} = 4.5V	5.1A
	29mΩ @ V _{GS} = 2.5V	4.8A

Description

This new generation MOSFET has been designed to minimize the on-state resistance (R_{DS(ON)}) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- Battery Management
- Load Switch
- Battery Protection

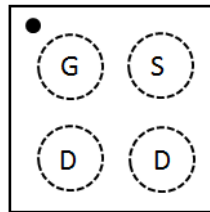
Features and Benefits

- Low Q_g & Q_{gd}
- Small Footprint
- Low Profile 0.62mm Height
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

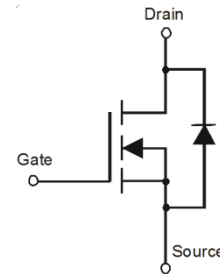
Mechanical Data

- Case: U-WLB1010-4 (Type C)
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal: Finish - SnAgCu. Solderable per MIL-STD-202 Method 208 

U-WLB1010-4 (Type C)



Top View



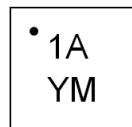
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN1023UCB4-7	U-WLB1010-4 (Type C)	3000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



1A = Product Type Marking Code
 YM = Date Code Marking
 Y or $\bar{Y}$ = Year (ex: F = 2018)
 M or $\bar{M}$ = Month (ex: O = October)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021
Code	C	D	E	F	G	H	I

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	12	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	5.1	A
		T _A = +70°C		4.1	
Continuous Drain Current (Note 5) V _{GS} = 2.5V	Steady State	T _A = +25°C	I _D	4.8	A
		T _A = +70°C		3.9	
Pulsed Drain Current (Note 6)			I _{DM}	15	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P _D	0.8	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7)	R _{θJA}	149	°C/W
Power Dissipation (Note 5)	P _D	1.2	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	102	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	12	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1.0	μA	V _{DS} = 9.6V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.4	0.7	1.2	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	18	23	mΩ	V _{GS} = 4.5V, I _D = 1A
		—	22	29		V _{GS} = 2.5V, I _D = 1A
		—	29	42		V _{GS} = 1.8V, I _D = 1A
Forward Transfer Admittance	Y _{fs}	—	8	—	S	V _{DS} = 6V, I _D = 1A
Diode Forward Voltage	V _{SD}	—	0.7	1.0	V	V _{GS} = 0V, I _S = 1A
Reverse Recovery Charge	Q _{RR}	—	1.3	—	nC	V _{DD} = 6V, I _F = 1A,
Reverse Recovery Time	t _{RR}	—	11.2	—	ns	di/dt = 100A/μs
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	288	440	pF	V _{DS} = 6V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	204	310		
Reverse Transfer Capacitance	C _{rss}	—	20	30		
Series Gate Resistance	R _G	—	3.3	6.6	Ω	f = 1MHz, V _{GS} = 0V, V _{DS} = 0V
Total Gate Charge	Q _g	—	2.3	3.0	nC	V _{GS} = 4.5V, V _{DS} = 6V, I _D = 1A
Gate-Source Charge	Q _{gs}	—	0.27	—		
Gate-Drain Charge	Q _{gd}	—	0.15	—		
Gate Charge at V _{TH}	Q _{g(TH)}	—	0.13	—		
Turn-On Delay Time	t _{D(ON)}	—	3	5	ns	V _{DS} = 6V, V _{GS} = 4.5V, R _G = 20Ω, I _D = 1A
Turn-On Rise Time	t _R	—	6	—		
Turn-Off Delay Time	t _{D(OFF)}	—	18	27		
Turn-Off Fall Time	t _F	—	9	—		

- Notes:
- Device mounted on FR-4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu.
 - Repetitive rating, pulse width limited by junction temperature.
 - Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

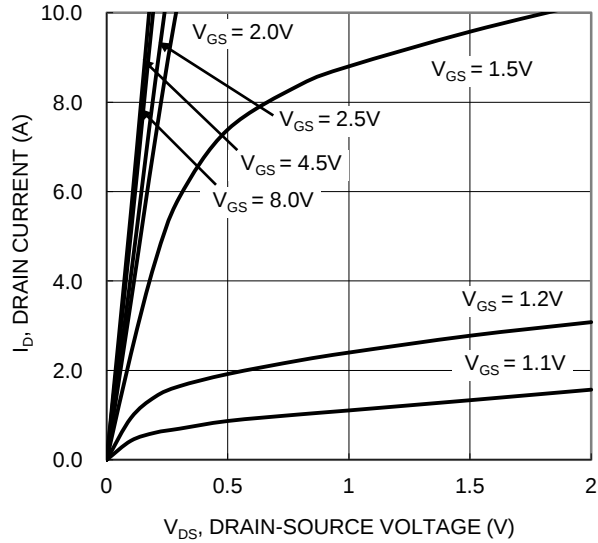


Figure 1. Typical Output Characteristic

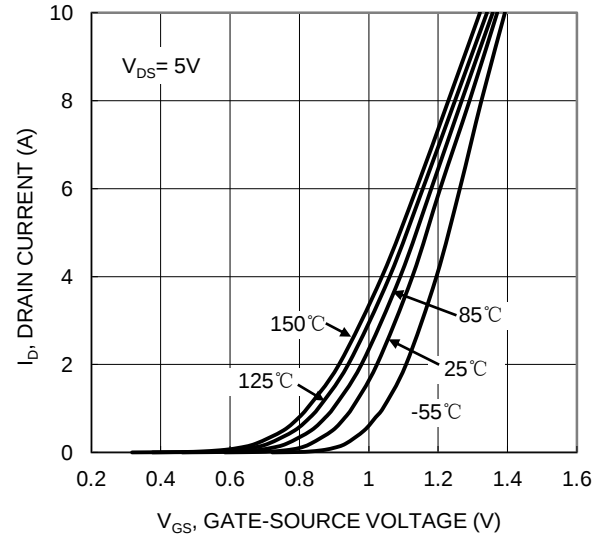


Figure 2. Typical Transfer Characteristic

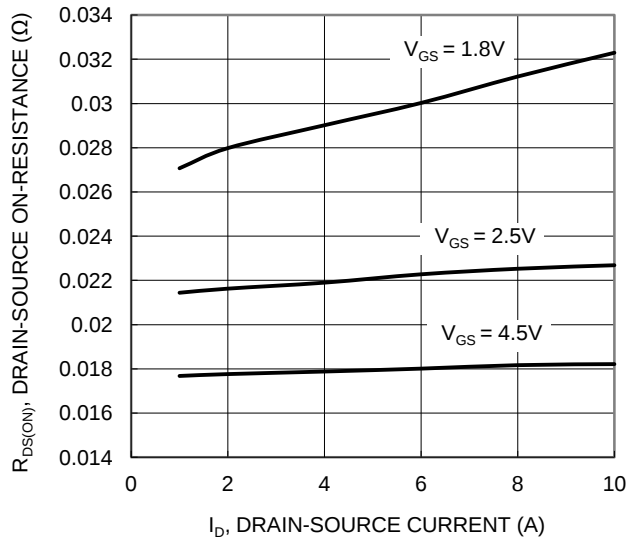


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

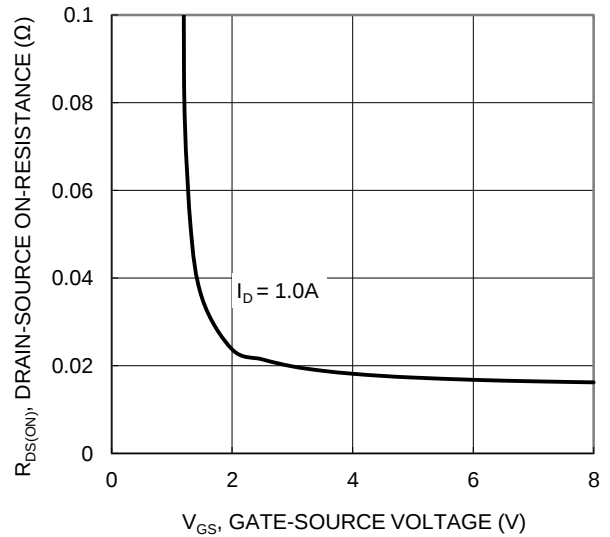


Figure 4. Typical Transfer Characteristic

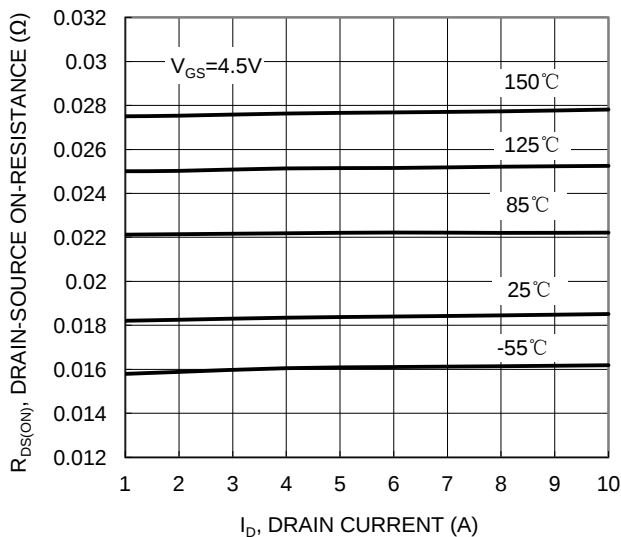


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

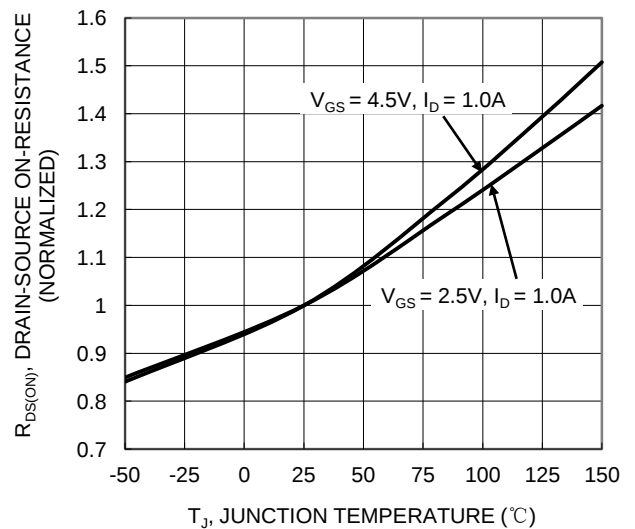


Figure 6. On-Resistance Variation with Junction Temperature

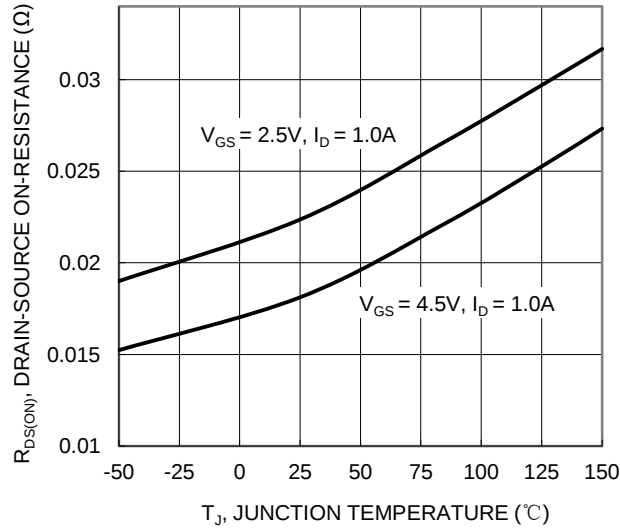


Figure 7. On-Resistance Variation with Junction Temperature

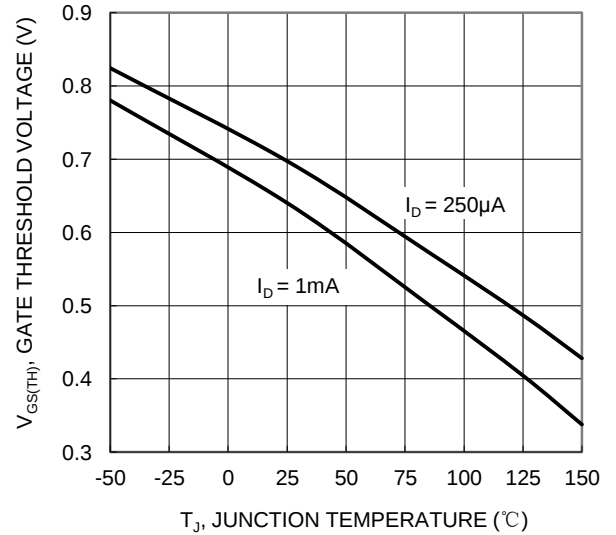


Figure 8. Gate Threshold Variation vs. Junction Temperature

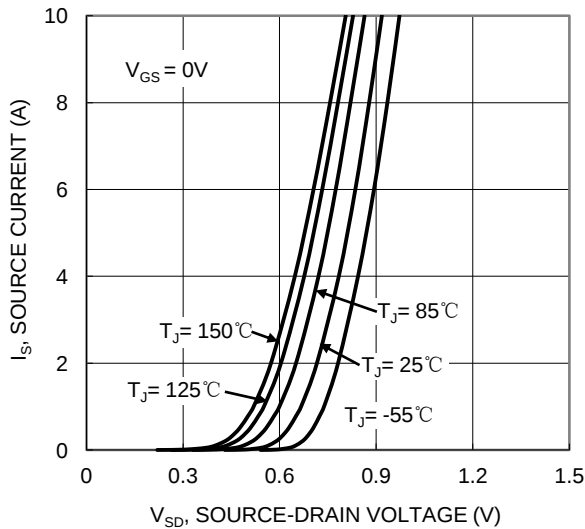


Figure 9. Diode Forward Voltage vs. Current

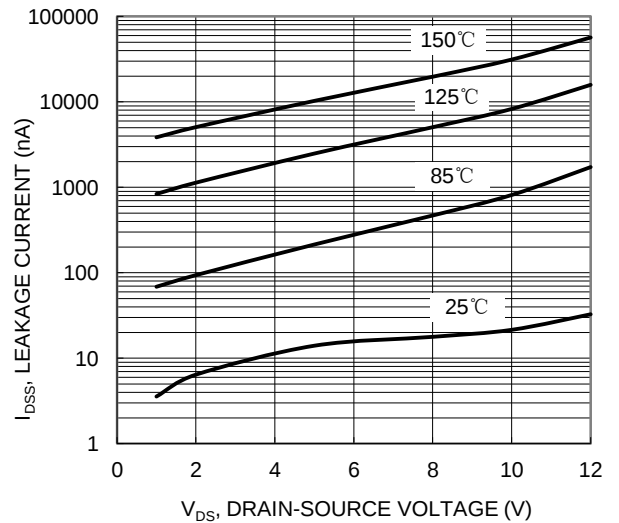


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

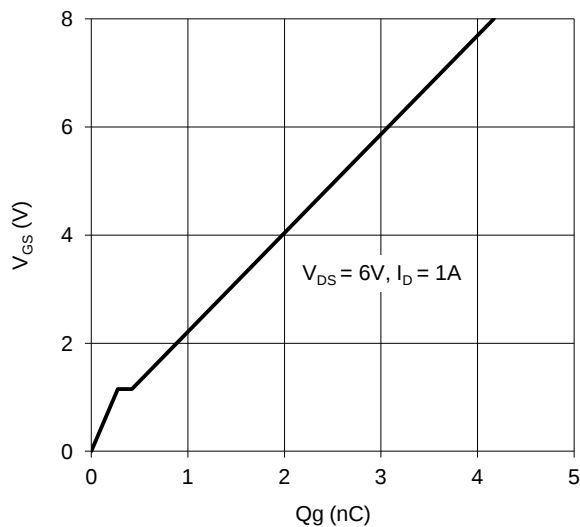


Figure 11. Gate Charge

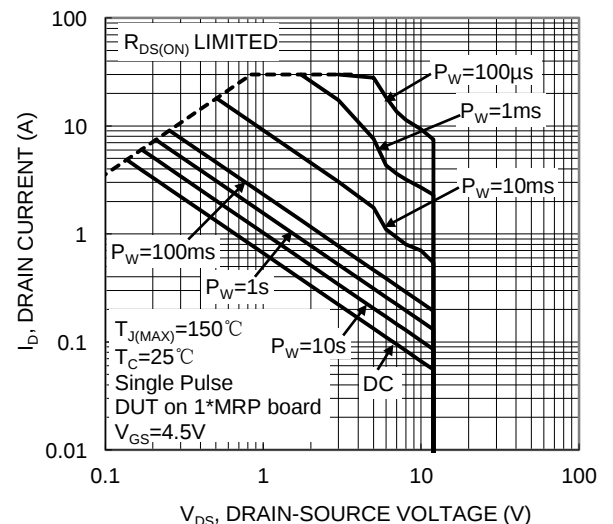


Figure 12. SOA, Safe Operation Area

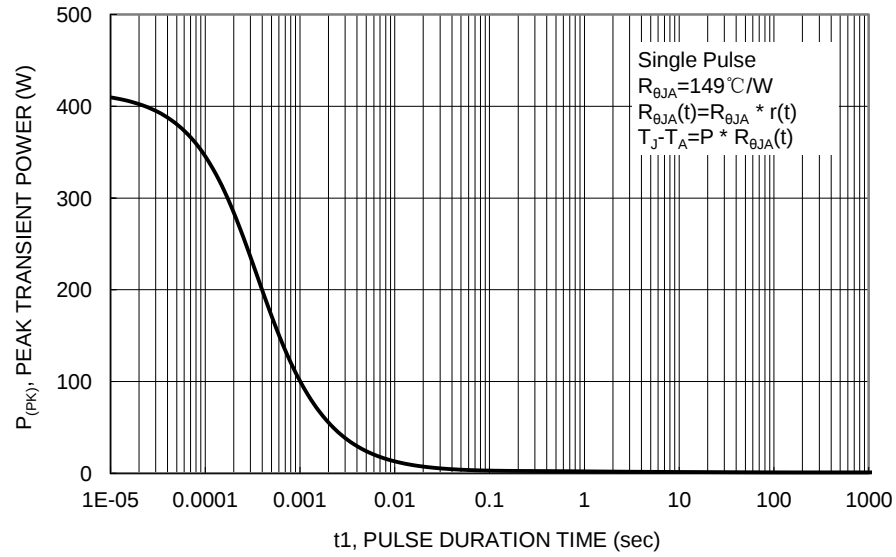


Figure 13. Single Pulse Maximum Power Dissipation

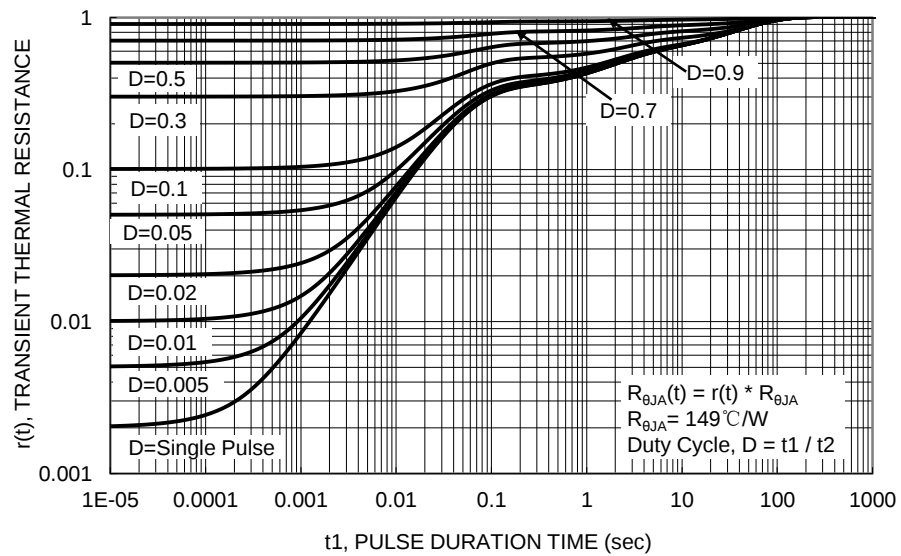
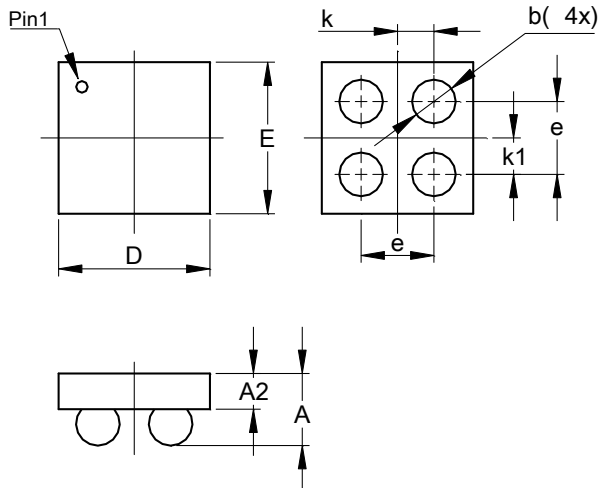


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

U-WLB1010-4 (Type C)

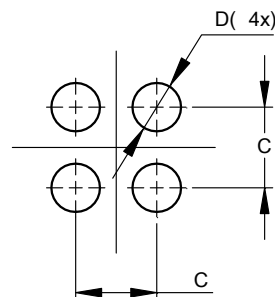


U-WLB1010-4 (Type C)			
Dim	Min	Max	Typ
A	--	0.62	--
A2	--	--	0.38
b	0.25	0.35	0.30
D	0.92	1.00	0.96
E	0.92	1.00	0.96
e	--	--	0.50
k	--	--	0.25
k1	--	--	0.25
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

U-WLB1010-4 (Type C)



Dimensions	Value (in mm)
C	0.500
D	0.300

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